Information Bulletin

Grade 6 Mathematics
1995-96

Alberta
EDUCATION

This document was written primarily for:

Students	✓
Teachers	✓
Administrators	✓
Parents	
General Audience	
Others	✓ Superintendents

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This bulletin contains general information about the Provincial Student Assessment program and information specific to the Grade 6 Mathematics Achievement Test. **This bulletin replaces all previous bulletins.**
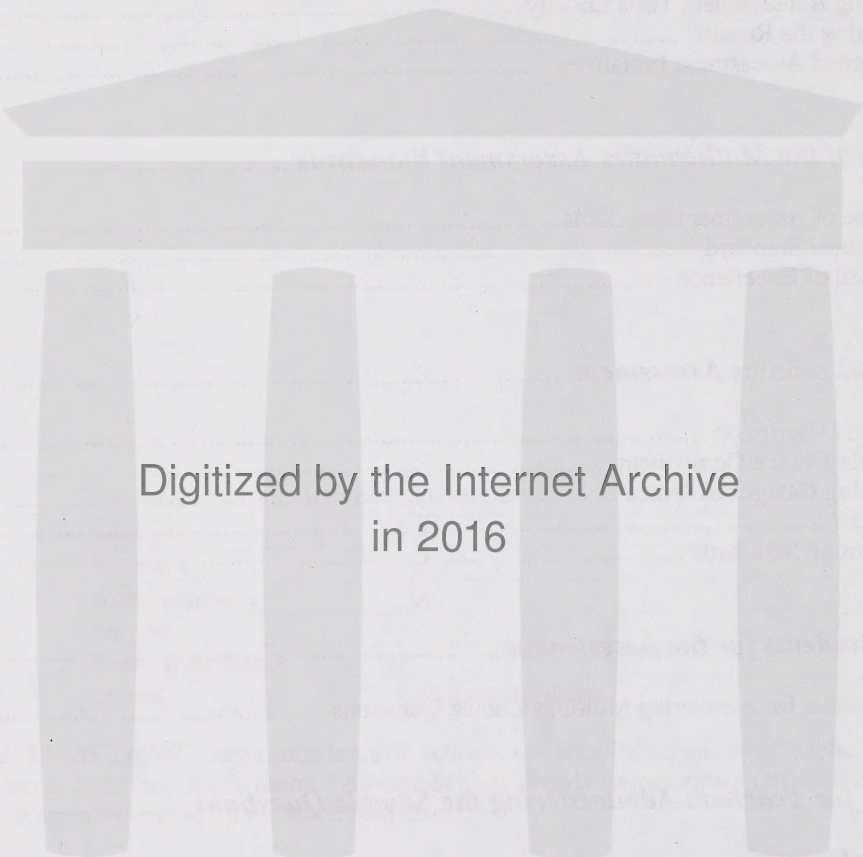
October 1995

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General Information

The Provincial Student Assessment Program provides teachers, parents, students, school administrators, Alberta Education, and the public with information about what students know and can do in relation to provincial standards. Group results are reported at school, district, and provincial levels to improve learning opportunities for students.

The assessments are administered in two subject areas at Grade 3—language arts and mathematics—and in four subject areas at grades 6 and 9—language arts, mathematics, social studies, and science.

The assessments are based on provincial standards, which reflect important learnings in the subject areas listed above. Classroom teachers from across the province are extensively involved in developing and field testing the assessment instruments.

Administering the Assessment

Information about the nature of the provincial assessments as well as their administration to special needs students can be found in the *General Information Bulletin, Provincial Student Assessment Program,* which is mailed to all superintendents and principals each fall.

Schedule

The written-response component of English and French Language Arts will be administered during the last week of May. The multiple-choice component of all achievement tests will be administered during the last two weeks of June. Specific information regarding scheduling is provided in the current *General Information Bulletin, Provincial Student Assessment Program.*

To minimize any risks to security, we recommend that all students complete the test on the same day. Superintendents approve a local schedule for achievement test administration within the dates provided. Students who are absent when the tests are administered and who return to school by the end of the school year must write the tests upon their return. By scheduling the tests early in the administration period, most, if not all, absentees can be tested upon their return to school. The principal is responsible for ensuring the security of the tests.

The tests that will be administered each year are:

Grade 3
English Language Arts (*Part A: Writing* and *Part B: Reading*)
Mathematics (English and French forms)

Grade 6
English Language Arts (*Part A: Writing* and *Part B: Reading*)
Français 6e Année (*Partie A: Production écrite* and *Partie B: Lecture*)
Mathematics (English and French forms)
Science (English and French forms)
Social Studies (English and French forms)

Grade 9
English Language Arts (*Part A: Writing* and *Part B: Reading*)
Français 9e Année (*Partie A: Production écrite* and *Partie B: Lecture*)
Mathematics (English and French forms)
Science (English and French forms)
Social Studies (English and French forms)

Students in French Immersion Programs

All students in French Immersion programs must write the French form of the achievement tests. Alberta Education will send a checklist to schools by January requesting an indication of how many English or French tests are required. These forms must be returned through jurisdiction offices by mid-February.

Marking Achievement Tests Locally

Teachers will be able to mark the tests before returning them to Alberta Education. Teachers can use the results as part of an individual student's year-end assessment, as well as for planning instruction.

Reporting the Results

Each school jurisdiction will receive a district report and individual school reports regarding their students' achievement, as well as guidelines for interpreting these results in relation to provincial standards.

To facilitate reflection on school programs, we expect that results will be shared with all school staff (not just teachers of grades 3, 6, and 9), as well as with parents and the community.

An individual profile for each student will be sent to the school that the student will attend in September. We also expect that these reports will be shared with parents.

Provincial results for each subject and grade will be made public in September, in documents titled *Assessment Highlights.*

Broadened Assessment Initiatives

The Student Evaluation Branch has developed additional instruments to collect a broader base of information about what students know and can do than achievement tests themselves can provide. These instruments will be administered to a provincial sample of students in all subjects on a rotating basis. The following assessments will be given in 1996:

Grade 3
• problem-solving activities in mathematics

Grade 6
• "whole book" performance-based assessment in language arts

Grade 9
• problem-solving activities in mathematics

Description of the Mathematics Assessment Standards

The provincial standards are the basis upon which we assess how well students have learned mathematics by the end of Grade 6. These standards reflect the essential learnings that all Alberta students are expected to achieve. Provincial standards are useful, therefore, for assessing Grade 6 students in all types of school programs—public, private, and home education.

Purpose of Assessment Standards

The following statements describe what is expected of Grade 6 students who are meeting the *acceptable standard* or the *standard of excellence* on independent work at the end of the Grade 6 Mathematics program. The statements represent the standards against which student achievement will be measured. By comparing actual results with provincial standards, decisions can be made about whether achievement is, in fact, "good enough."

Acceptable Standard

Students who meet the *acceptable standard* in Grade 6 Mathematics are expected to have a basic understanding of mathematical concepts and related procedural knowledge. They are expected to be able to demonstrate their understanding in concrete, pictorial, and symbolic modes and be able to translate from one mode to another. For example, students meeting the *acceptable standard* should know that the solution to the number sentence $42 \times 2 = \square$ is 84 and be able to demonstrate their

understanding in concrete and pictorial ways. They are able to write related number sentences and verify them using manipulatives and diagrams.

To meet the *acceptable standard*, students are expected to communicate about mathematical situations in an understandable way using objects, diagrams, and appropriate everyday and mathematical terms. They are expected to understand mathematical questions presented with objects, diagrams, or symbols in everyday and school contexts.

Students meeting the *acceptable standard* are expected to perform the mathematical operations and procedures that are fundamental to mathematics in Grade 6 and apply what they know in solving routine problems in familiar settings. They are able to describe the steps they used to solve a particular problem and to defend their solution to the problem.

The expectation is that students meeting the *acceptable standard* have a positive attitude about mathematics and a sense of personal competence in using mathematics in their daily lives. They are able to demonstrate confidence when using common mathematical procedures and when applying problem-solving strategies in familiar settings.

Standard of Excellence

Students who meet the *standard of excellence* in Grade 6 Mathematics are expected to have a superior understanding of mathematical concepts and related procedural knowledge. They are consistently able to demonstrate their understanding in concrete, pictorial, and symbolic modes, and easily translate from one mode to another. They are able to create problem situations to illustrate concepts and to analyze and explain relationships among concepts. For example, students meeting the *standard of excellence* should be able to write all number sentences related to $42 \times 2 = \square$,

justify them using manipulatives and diagrams, and create problem situations to exemplify the relationship. They should be able to compare the set of related sentences with sentences showing other operations on the numbers.

To meet the *standard of excellence,* students are expected to verbalize and write about mathematical situations clearly, using correct technical terms. They are expected to understand mathematical questions presented with objects, diagrams, or symbols in both common and unusual contexts.

Students meeting the *standard of excellence* are expected to perform the mathematical operations and procedures that are fundamental to mathematics in Grade 6 and to be able to apply what they know in solving and creating novel problems. They are able to clearly describe the steps that they or other students used to solve a particular problem and can suggest alternative procedures and/or solutions.

Students meeting the *standard of excellence* should have a positive attitude toward mathematics and show confidence in performing mathematical tasks. They are expected to be self-motivated risk-takers who persevere when solving novel problems. They take initiative in trying new methods and are creative in their approach to problem solving.

Grade 6 Mathematics Assessment

General Description

The Grade 6 Mathematics Assessment consists of four components:

- *Multiple-choice component*—completed each year by all Grade 6 students in the province.

- *Timed computation tests*—completed in June 1995 by a provincial sample of Grade 6 students. A master copy has been forwarded to all schools for those teachers who wish to administer timed computation tests.

- *Performance-based component*—completed in June 1995 by a provincial sample of Grade 6 students. The next provincial administration will be in June 1999.

- *Learning context survey*—completed in 1995 by a provincial sample of Grade 6 teachers and students. The next provincial administration will be in June 1999.

In 1996, only the multiple-choice component will be administered.

Multiple-Choice Component

The multiple-choice component consists of 50 questions* integrated in narrative themes. The assessment is designed to be completed in 60 minutes. However, additional time of up to 30 minutes may be provided to allow all students to finish.

The blueprint for the multiple-choice component is on page 5 of this bulletin, followed by sample questions, beginning on page 7, that teachers can use with students to help them prepare for the test.

Students will record answers to questions on the answer sheet provided (see page 16 for practice answer sheet).

Students will require HB pencils, rulers, and erasers. They may also need scrap paper.

Students may use manipulative materials and calculators when completing the multiple-choice component.

Reporting Categories Indicators

The following points briefly highlight the learnings for each reporting category.

Knowledge
- recall facts, concepts, terminology
- knows number facts
- recognizes place value
- knows the procedure for algorithms, computations
- knows the procedure for constructions, measurements
- knows how to use calculators/computers
- knows mental computation, estimation strategies

Skills
- represents basic mathematical concepts in concrete, pictorial, and /or symbolic modes
- applies a mathematical concept in a variety of familiar situations
- creates new problem situations that exemplify a concept
- judges reasonableness of answers
- justifies answers
- communicates why and when certain strategies are appropriate
- demonstrates relationships among numbers, operations, number forms, and modes of representation
- demonstrates relationships among geometric forms
- applies mathematical knowledge to solve problems
- uses a variety of problem-solving strategies
- applies mathematical concepts in new situations

* *All Grade 6 Achievement Tests will consist of 50 questions.*

Blueprint

Reporting Categories	Knowledge	Skills	Total Number of Questions/Percent
Numeration	5	9	14 (28)
Operations and Properties	3	10	13 (26)
Measurement	2	4	6 (12)
Geometry	3	4	7 (14)
Graphing	5	5	10 (20)
Total Number of Questions/Percent	18 (36)	32 (64)	50 (100)

Confirming Standards

Confirming standards is a process whereby judgements about students' performance on the assessment are made in relation to provincial standards. For more information on confirming standards procedures, refer to Appendix A of the *Achievement Testing Program Provincial Report, June 1993 Administration*. For information on the selection of teachers for participation in the confirming standards process, refer to the current *General Information Bulletin, Provincial Student Assessment Program.*

Preparing Students for the Assessment

> *I strongly advocate preparing children to understand tests and testing through extensive class discussion about the makeup of the test and how to take it, and then adequate practice to find out their own particular weaknesses in approaching tests.*
>
> —Graves, p. 183

We hope that teachers will share the following information with their students to help them prepare for the mathematics assessment.

Suggestions for Answering Multiple-Choice Questions

The following comments are provided to help prepare students for the Grade 6 Mathematics multiple-choice questions.

- The questions in the assessment are integrated into narrative themes.

- Use the information given by:

  a. looking at all the information and thinking carefully about it before you try to answer the questions; or

  b. reading the questions first and then looking at the information, remembering the questions you need to answer.

- When you are given information for more than one question, remember to *go back to the information before answering **each** question*.

- *Make sure you look at all forms of the information given.* Information may be given in words, charts, pictures, graphs, and maps.

- *Check your work when you calculate an answer,* even when your answer is one of the choices.

- When answering questions, *choose the answer you think is best.* If you don't see a correct or best answer right away, try to find the two choices that seem closest to the correct answer and pick one of them for the answer.

Suggestions for Teachers Administering the Sample Questions

Familiarize your students with the format of the machine-scorable component of the assessment and the kinds of questions that will appear on it by having them work through the sample questions. A practice answer sheet is provided.

Establish an environment suitable for test taking and allow students to complete the sample questions, recording answers on the practice answer sheet.

These sample questions appeared in the June 1995 mathematics test. All other questions from the June 1995 test remain secured.

When the sample questions are completed and marked, discuss with the class the time needed to do the work and the accuracy of the work, and address any specific concerns raised by students.

This collection of questions does not represent the test emphasis as presented in the blueprint.

Ms. Thompson's Grade 6 class at Prairieview School has planned a year-end field trip. The 25 students, Ms. Thompson, and 4 supervisors are looking forward to visiting mountain park vacation spots, including Jasper and Banff, on their five-day trip.

Now, join the class and their supervisors on the trip. Help them solve the real-life problems they experience.

Getting Ready

Use the following information to answer question 1.

Four students had luggage with these masses:

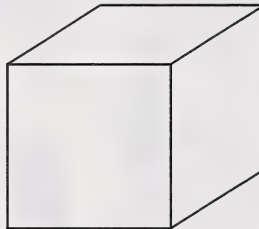Dana 9.7 kg   Roger 9.65 kg   Chandra 9.08 kg   Michael 9.2 kg

1. Which student had the luggage with the greatest mass?

    A. Dana
    B. Roger
    C. Chandra
    D. Michael

_____

Use the following information to answer question 2.

Roger packed his camping gear in this cube-shaped box.

2. How many vertices does this box have?

    A. 16
    B. 12
    C. 8
    D. 4

The Trip

Use the following information to answer question 3.

When the bus left Prairieview School, the odometer read: | 1 | 6 | 0 | 0 | 7 |

At the lunch stop, the odometer read: | 1 | 6 | 2 | 1 | 9 |

Jasper is 97 km from the lunch stop.

3. When the bus arrived at Jasper, what did the odometer read?

    A. 16 104
    B. 16 316
    C. 16 406
    D. 16 528

_____

4. At a gift shop, Tim purchased a comic for $2.00, a mug for $5.95, and a T-shirt for $16.95. Which column should he use to do the addition?

    A.   2.00
           5.95
       + 16.95

    B.   2
         595
      + 1695

    C.   2
       5.95
     + 16.95
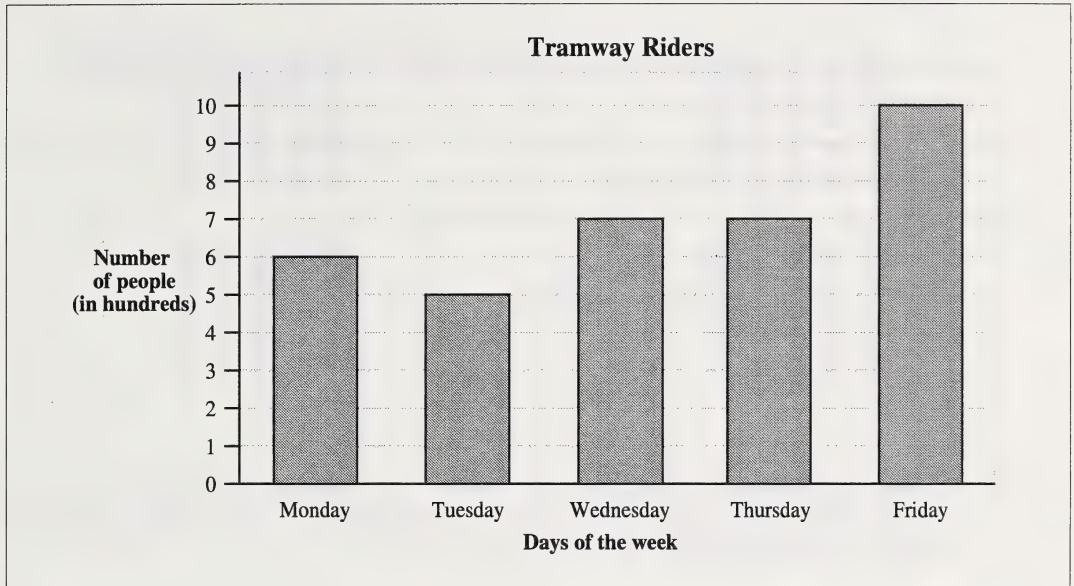
    D.   2
     5. 95
    + 16.95

The next day, the students visited the sights around Jasper. Omar observed that the Jasper Tramway formed an angle with the surroundings.
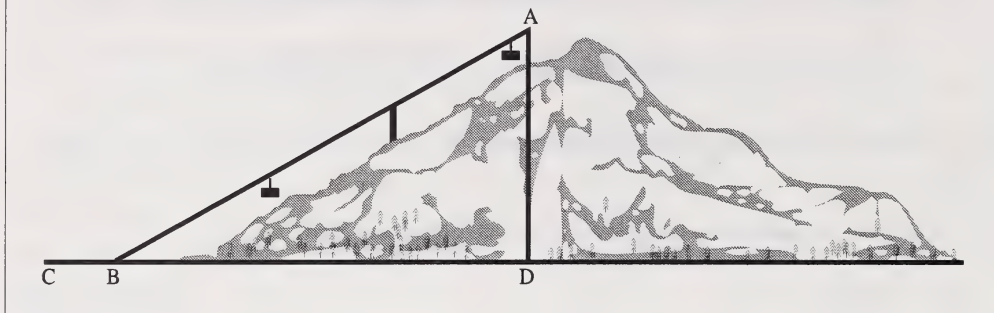
5. What kind of angle is ∠*ABD*?

A. Right

B. Acute

C. Obtuse

D. Straight

Use the following graph to answer questions 6 and 7.

Tramway Riders

6. What was the total number of riders for these 5 days?

   A.   35
   B.   350
   C.   3 500
   D.   35 000

7. How many fewer people took the Tramway on Monday and Tuesday than on Thursday and Friday?

   A.   6
   B.   11
   C.   280
   D.   600

8. Two-fifths of the class wanted to hike to Wolverine Canyon. This fraction could be represented as

A.

B.

C.

D.

9. Cindy was in charge of filling the water cooler. If each person can drink about 1.7 L of water per day, what would Cindy use as a reasonable estimate for the total amount of drinking water needed for 30 people per day?

A. 30 L

B. 40 L

C. 60 L

D. 70 L

10. Sheila and Danielle saw a squirrel on their picnic table. What would be a good estimate for the length of a squirrel from head to tail?
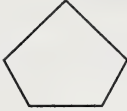
A. 2.5 m

B. 2.5 cm

C. 0.25 m

D. 0.25 cm

11. There is a team crest on Henry's jacket that:

- is a polygon
- has more sides than a triangle but fewer sides than a hexagon
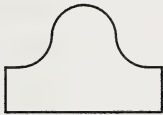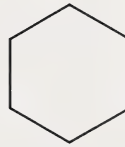- is not a quadrilateral

What is the shape of the crest?

A.

B.

C.

D.

12. Ryan's chocolate bar wrapper said that he could win a prize if he answered the following "skill-testing question."
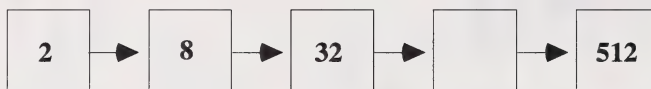
$$
\begin{array}{r}
? \\
\times\ 13 \\
\times\ 10 \\
\div\ \ 4 \\
\div\ \ 5 \\
=923
\end{array}
$$

What is the value of the question mark?

A.   130
B.   142
C.   2600
D.   5999.5

At the campfire talk in the evening, a park ranger showed data about marmots. The following chart shows how the population of the marmots can increase over four years.

| 2 | → | 8 | → | 32 | → | | → | 512 |

13. The number that is missing in the chart is

A. 64
B. 128
C. 206
D. 256

The class looked at a record of where four forest fires occurred in the park after a lightning storm.
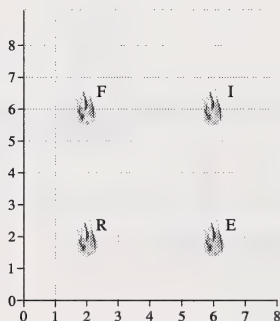
14. The worst fire was spotted at location (6,2). This fire is at position

A. F
B. I
C. R
D. E

15. Terry forgot the Prairieview bus number. These are some facts about the bus number that Terry remembered:

- it has three digits
- the digit in the ones place is greater than one
- the digit in the hundreds place is two times the ones place
- there is a zero in the number

What could the bus number be?

A.   204

B.   240

C.   402

D.   420

Use the following diagram to answer question 16.

The bus stopped at a Buffalo Paddock.

450 m

250 m

Buffalo Paddock

300 m
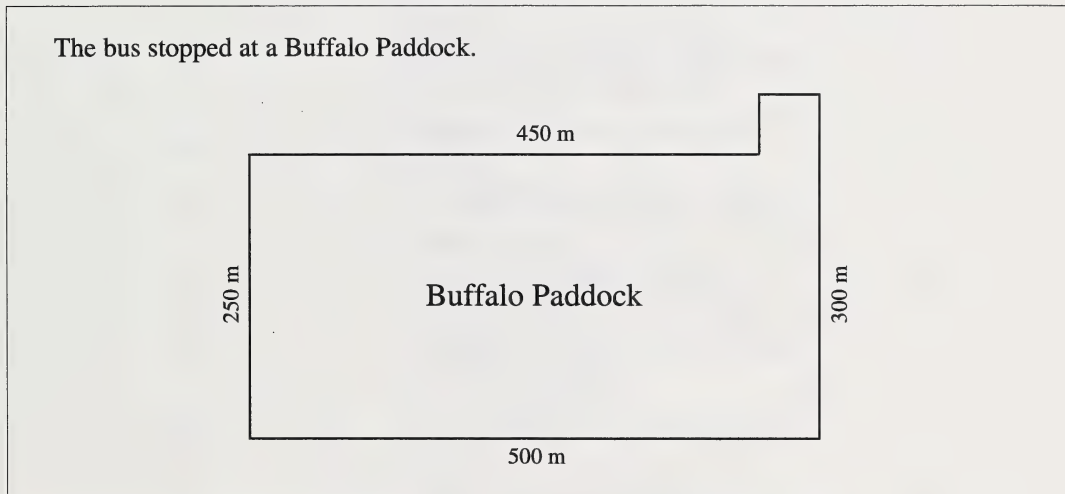
500 m

16. Cheryl and Stacey walked along the perimeter of the paddock. What distance did they walk?

A.   1100 m

B.   1500 m

C.   1600 m

D.   7500 m

17. Sandy and Bill kept a record of temperatures during their stay. Which group of temperatures is arranged from **lowest** to **highest**?

- **A.** −2, −6, 0, 1, 2
- **B.** −6, −2, 0, 1, 2
- **C.** 0, 1, 2, −2, −6
- **D.** −2, 0, 1, 2, −6

Practice Answer Sheet for Multiple-Choice Questions

MULTIPLE CHOICE
1 Ⓐ Ⓑ Ⓒ Ⓓ
2 Ⓐ Ⓑ Ⓒ Ⓓ
3 Ⓐ Ⓑ Ⓒ Ⓓ
4 Ⓐ Ⓑ Ⓒ Ⓓ
5 Ⓐ Ⓑ Ⓒ Ⓓ
6 Ⓐ Ⓑ Ⓒ Ⓓ
7 Ⓐ Ⓑ Ⓒ Ⓓ
8 Ⓐ Ⓑ Ⓒ Ⓓ
9 Ⓐ Ⓑ Ⓒ Ⓓ
10 Ⓐ Ⓑ Ⓒ Ⓓ
11 Ⓐ Ⓑ Ⓒ Ⓓ
12 Ⓐ Ⓑ Ⓒ Ⓓ
13 Ⓐ Ⓑ Ⓒ Ⓓ
14 Ⓐ Ⓑ Ⓒ Ⓓ
15 Ⓐ Ⓑ Ⓒ Ⓓ
16 Ⓐ Ⓑ Ⓒ Ⓓ
17 Ⓐ Ⓑ Ⓒ Ⓓ

Key and Descriptors for Sample Questions

Ques. No.	Key	Program Strand*	Reporting Category**	Curriculum Standard	Assessment Standard***
1	A	N	S	Order decimal numbers	A
2	C	G	S	Determine the number of vertices on a cube	A
3	B	OP	S	Solve a multi-step problem using operations of subtraction	A
4	A	OP	K	Identify appropriate algorithm for addition	A
5	B	G	K	Classify angles according to size	A
6	C	GR	S	Interpret the graph and add	A
7	D	GR	S	Interpret the graph and subtract	A
8	D	N	S	Represent a written fraction pictorially	A
9	C	OP	S	Decide this is a multiplication situation and estimate the product of a decimal and whole number	A
10	C	M	S	Determine the most reasonable measure	A
11	A	G	S	Synthesize a polygon from attributes given	E
12	B	OP	S	Apply the strategy of working backwards to solve the problem	E
13	B	N	S	Interpret a number pattern and find the missing number	A
14	D	GR	K	Find the location of an ordered pair on a grid	A
15	C	N	S	Apply place value concepts	E
16	C	M	S	Determine a strategy to find the perimeter of a polygon with some measurements missing	E
17	B	N	K	Order integers	A

*   G—Geometry, GR—Graphing, M—Measurement, N—Numeration, OP—Operations and Properties
**   K—Knowledge, S—Skills
***   A—Students meeting the acceptable standard should be able to correctly answer questions such as these.
       E—In addition to answering the questions identified for the acceptable standard, students meeting the standard of excellence should be able to correctly answer questions such as these.

Credit

Donald H. Graves, *Build a Literate Classroom* (Toronto: Irwin Publishing, 1991), p. 183.

Alberta Education Contact

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